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Gateway 3 : Enabling Knowledge Strategies

Musicon Valley – reflections on innovative alliances involving technological research and the cultural sector

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Setting the scene

In this paper we will describe and discuss the development of the Musicon Valley initiative seen from the perspective of Risø National Laboratory - a national technological research institute. We want to discuss the challenges and dynamics of cooperation between creative industries and technological research. We reflect on Risø as a player in regional development. Further, we want to discuss how these two aspects can encourage a national research institute in bringing its role and rationale in better agreement with emerging societal expectations and demands.

New agenda – creative content of products and services

Referring to Florida & Tinagli (2004), the US and Europe is going through a period of sweeping economic and social transformation – from an industrial to a creative economy. This transformation is based fundamentally on human intelligence, knowledge and creativity. Creativity is the motor force of economic growth. Today, from between 25 to more than 30 percent of workers in the advanced industrial nations work in the creative sector of the economy (science & engineering, research & development, technology-based industries, arts, music, culture, aesthetic, architecture, design etc.).

Experience and creative content are becoming still more important elements of any product or service as the determining competitive edge. Knowledge intensive industrial manufactures acknowledge that the immaterial dimension of both their products and their brand/organisation as such are becoming increasingly important to address. Referring to Mandag Morgen (2002), there is an increasing demand to balance the increased use of technology (high tech) with human facets (high touch). Developers of products and services should not only focus on efficiency and rational solutions but also to embody high touch dimensions as art, intellectual fellowship and creativity.

The regional dimension of the creative economy

According to Florida & Tinagli (2004), the ability to compete and prosper in the global economy goes beyond trade in goods and services and flows of capital and investment. Instead, it increasingly turns on the talent of nations or regions within nations to mobilise creative capacities, i.e. to attract, retrain and develop creative people. Creativity is a broad social process and requires teamwork. It is stimulated by human exchange and networks; it takes place in real communities and places.

With reference to O'Connor (2000), the successful city of the 21st Century will be a city of culture. Culture does not just mean cultural products - whether 'high' or 'popular', local or global - it means ways of living and acting, of expressing, of thinking and learning. The cities that learn to respond to the cultural challenge will emerge best

equipped in a competitive world where information, knowledge and content creation represent the keys to a sustainable local economy. Cultural economy is part of global flow but in this the distinctiveness of local business clusters is crucial.

Regions are expected to have a core role in the development of the European Research Area. They can play a key role in driving economic growth through, for example, the development of regional innovation strategies, local level partnerships and clusters of related enterprises and researchers. Dynamic regions can contribute to turning Europe into the most competitive knowledge-based economy in the world by 2010, a goal set by the March 2000 Lisbon European Council. The European Research Area concept implies, that efforts should be deployed effectively at different administrative and organisational layers: at European, national, regional or even local level. In this way, measures would not only be mutually consistent but better adapted to the potential of the regions themselves. (CEC, 2001). This highlights the importance of development of science and technology for all policy fields by the European Commission together with national and regional actors. To be successful, the European Research Area requires a coherent development of research in close dialogue with societal actors affected by these policies (Europa Kommissionen, 2002).

Referring to Lagendijk & Cornford (2000), the regional development industry needs concepts, notions, theories and models which can help organisations to undertake the task of developing regional economies. A huge amount of conferences, reports, seminars etc. have already been established to aid the circulation of ideas around regional development industries and players. In short, the regional development industry resembles the description of Mode II knowledge given by Gibbons et al. (1994). While Mode I knowledge is disciplinary-based, hierarchical, science-oriented and based on the linear model of knowledge flows, Mode II knowledge is, in contrast, trans-disciplinary, heterogeneous, organisationally transient, more socially robust and reflexive.

New mission for national laboratories – science's new role in society

Many of Europe's governmental mission oriented research laboratories have been founded in years after World War II with mission statements related to defence and nuclear research. After nuclear energy in many West European countries became less popular during the 1980s and the fall of the Berlin Wall in 1989, governments' strategic interests in "nuclear" and "defence" was not longer an important rationale behind mission oriented research. Partly as a consequence of this, government R&D expenditures fell dramatically during the 1980s and first half of the 1990s (European Commission, 1997).

During the 1990s, low economic growth, unemployment and lack of technological innovativeness compared to Japan and USA came high on the political agenda in Europe (CEC, 1993; CEC, 1995). Today, government policies on science and technology are often defined according to this agenda. The prime characteristics of the current and future developments in the research world are the ever-increasing foci on application and capitalisation of research ("entrepreneurial" science) and on convergence between public and private research. The boundaries and relationships between public (universities, research institutes etc.) and private driven research are in flux. Public and private organisations are assuming tasks that were formerly the province of the other sectors, and shaping these relations is increasingly a subject of research and technology management at different levels (Leydesdorff, 2000). University-industry-government relations can be considered as a triple helix of evolving networks of communication and co-operation. The triple helix model argues that a knowledge infrastructure is generated in terms of overlapping institutional spheres each taking the role of the other and with hybrid organisations emerging at the interfaces. The common objective for many countries and regions is to realise an innovative environment consisting of university spin-off firms, tri-lateral initiatives and strategic alliances among firms, governmental laboratories and academic research groups (Etzkowitz & Leydesdorff, 2000).

It seems that a new social contract between science and society is under development. Under the prevailing contract, science has been expected to produce reliable knowledge (i.e. in areas as defence and nuclear), provided merely that it communicates its discoveries to society. The contract under development must ensure that scientific knowledge is socially robust, and that its production is seen by society to be both transparent and participative (Gibbons, 1999).

Universities all over Europe and the rest of the World have difficulties in re-defining their role in this new paradigm (Etzkowitz et al., 2000). Still, the universities' role are affiliated with production of new scientists and technicians, and universities impact on society is assured through graduates' employment in academia, industry and government. The impact of government laboratories is more difficult to define. Managers of mission orientated national laboratories have faced a myriad of challenges due to the shift of today's competitive environment.

Science research organisations, which operate at the cutting edge of creative innovation, require organisational designs capable of supporting this growing trend. The advent of an increasingly sophisticated and demanding clientele have confronted many knowledge-based organisations with the need to become more innovative and better able to generate customised solutions. There is an ongoing debate as to how a traditional organisation could best be redesigned to meet the demands of this complex and dynamic environment (Simpson & Powell, 1999).

Musicon Valley Growth Environment

Musicon Valley (http://www.musiconvalley.dk/) represents the vision of developing the Roskilde region in Denmark in terms of the keywords music and knowledge. The vision is "to create an international power centre for creative industries in the Øresund Region".

The first ideas of developing a creative industries cluster in Roskilde were formulated in the late nineties, and they were concretised with establishment of the Musicon Valley organisation in 2001. Musicon Valley builds on the regions positions of strength:

a) Roskilde offers a range of cultural activities, e.g. the Roskilde Festival (attracting an audience of about 70.000 people each year), the regional music club Gimle, the museums (e.g. Viking Ship Museum, Lejre Experimental Centre), the International Franz Schubert Society of Denmark, the Cathedral of Roskilde, the school of sacred music, folk music festival, jazz festival etc.
b) Roskilde is centre of education where at the moment about 20.000 young people are attending one of many short/medium-level and higher education programmes
c) the region has a high concentration of knowledge and research institutions (Roskilde University Centre, Risø National Laboratory, CAT Science Park, National Environmental Research Institute)

The Musicon Valley organisation is supported by the municipality, the county and the Ministry of Technology, Science and Innovation. Furthermore, companies contribute with competences, skills and manpower.

Risø is a technological research institution with about 700 employees and is a national laboratory under the Ministry of Science, Technology and Innovation. Risø contributes to the development of environmentally acceptable methods for energy technologies, industrial production and bioproduction. In 2002, Risø was contacted by the Musicon Valley initiators with an invitation to join the initiative. The immediate reaction was: "Risø has no interest in joining such a rock-circus", which illustrates some of the challenges and barriers in this kind of cooperation and development.

However, Risø decided to join the initiative for two main reasons: a) we are interested to contribute to regional development, b) we realised that technology has a role to play in the creative industries as indicated in Figure 1. The green parts of Figure 1 reflects the various supporting and underlying services and functions necessary in order to arrange and perform cultural events.

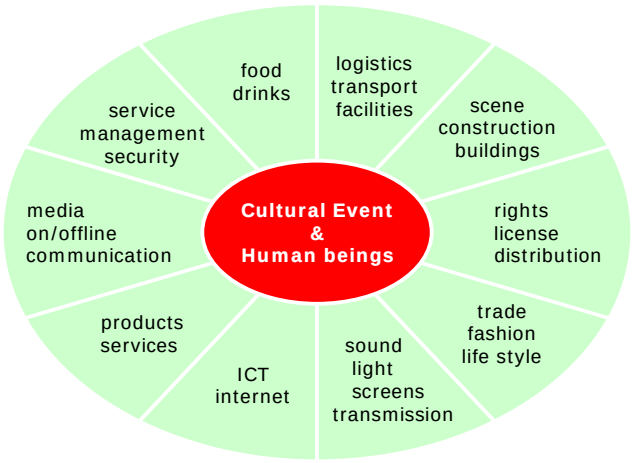

Figure 1. Supporting and underlying services and functions necessary to arrange and perform cultural events.

Risø's contribution has mainly been within the frame of Musicon Valley Growth Environment (in Danish, Musicon Valley Vækstmiljø), which is a triennial self-contained activity under the Musicon Valley umbrella addressing education and technology related to light and sound technologies. Other participants are: Roskilde University Centre, Roskilde Handelsskole, Roskilde Tekniske Skole, DPA Microphones, DPA Soundco, Seelite, ComTech, DELTA, Martin Professionals, CAT Innovation, Roskilde Festival and DR Produktion. The Musicon Valley Growth Environment is partly financed by the Ministry of Technology, Science and Innovation, and it was selected as one out of 11 regional incubation centres in Denmark on basis of the following criteria:

- establishment of knowledge and learning networks which can support regional development within strong regional occupational fields
- focusing research and education to regional occupational needs and applications
- increasing the role of research and education institutions in regional occupational development by closer cooperation between regional enterprises and research and education institutions
- development of new post-school educations and higher educations in accordance with industrial and commercial demands
- ensuring an improved anchoring and more dynamic interaction between technological developers and regional development within industry and commerce.

Innovation processes

Words such as "innovation" and "invention" are often used interchangeably, but while closely related, these notions are not the same (Kolodovski, 2005), see Figure 2:

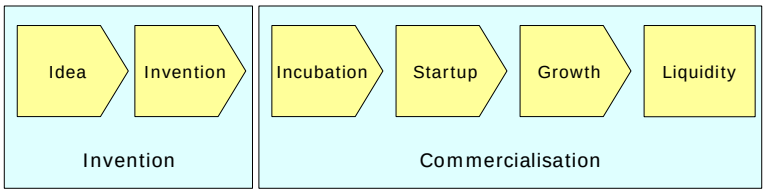

Figure 2. Innovation = Invention + Commercialisation

Invention is a creation of a new product or process. Commercialisation is the conversion of the invention into widespread use. Innovation can be presented as 6 distinct steps, see Figure 2, (Kolodovski, 2005):

1. Idea: identifying interesting problem to solve or discovering new technological capability
2. Invention: matching a problem and technical capabilities to create new solutions
3. Incubation: research and planning how to launch the invention into a marketplace
4. Start-up: establishing an organisation and from the plan to the first sale
5. Growth: building organisation and growing sales until company reaches profitability
6. Liquidity: receiving dividends from the company, or selling shares to other investors

The commercialisation part of the innovation process typically takes 10 to 100 times more time and resources than the Invention part to complete successfully. Inventors are often unaware of this fact and mistakenly assume that after they make the invention work, most of the job is done.

From our point of view, it is of important to see innovation activities and processes as dynamic interactions and interplays in a large institutional set-up, see Figure 3. In this approach the focus is on relations, learning processes and actions between different actors and areas of knowledge. Further, innovation processes are not considered to be unified and linear, but in contrast as an interactive process between a huge number of actors.

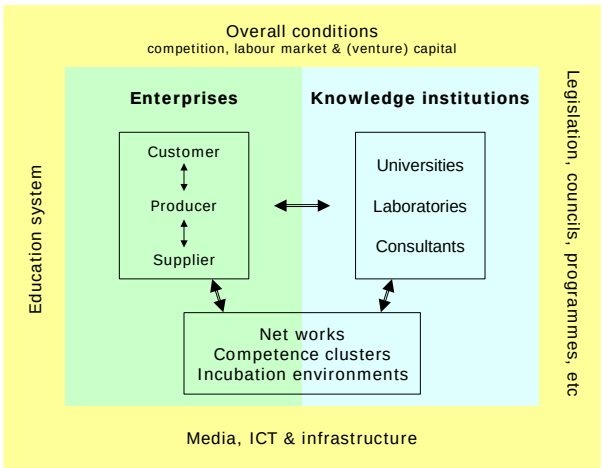

Figure 3. Innovation system (Andersen, 2004).

Lessons learned

Knowledge and knowledge transfer

Referring to Davenport & Prusak (1998), knowledge transfer involves two actions: transmission (sending or presenting knowledge to a potential recipient) and absorption by that person or group. If knowledge is not absorbed, it has not really been transferred. Knowledge transfer has a large impact on changes in behaviour and generation of new ideas, and consequently innovation inseparably is bound up with knowledge transfer. Also the Musicon Valley initiative has to face that big challenges and tasks are to consider and evaluate the means and processes organised to support and encourage knowledge transfer between the different actors. Therefore, an essential question has been how to establish meeting places and agendas that will appeal to scientific communities, artists and creative environments as well as the corporate sector and its manufactures.

There are no traditions for contact between the creative content providers, traditional industry, service sectors and research institutions. The creative content providers rarely get in touch with technological institutions, research and projects, or with social & economic disciplines such as management, enterprise-dynamics etc. In establishing meeting places and agendas it is crucial to be aware of, that knowledge transfer across institutional and disciplinary boundaries can involve tacit, explicit, and cultural knowledge to varying degrees, and that many factors can be barriers for knowledge transfer, e.g. different cultures and vocabularies, lack of time and meeting places, lack of absorptive capacity in recipients.

From the perspective of a technological research institute the knowledge transfer problem is twofold. On the one hand it is easier said than done for technological scientists to express and explain how their skills and competences can be used by the creative industries. The creative industry domain is completely new and unexplored for a research institute as Risø and it is very hard to see where, why and how our experiences and competences can contribute to the development of the creative sector in a meaningful way. On the other hand the actors in the creative sector are less trained in the exercise on transferring working life experiences and difficulties into structured problem-oriented projects.

It has been experienced that structured dialogue addressing practical problems is of utmost importance to identify common interests and fields where the different competences and capacities can be brought together into new initiatives. During the first years a few concrete technological projects have been identified either as part of Growth Environment or contacts established through other Musicon Valley arrangements and activities:

- *Wireless transmission of signals (audio, light and picture) which is protected for copying*. The users of light and sound technology formulated that a hard and resource demanding job is to dig in cables for transmission of signals. Technically, this kind of wireless of transmission is possible, but until know it has been troublesome to get from the invention phase into the commercialisation phase. One explanation is that the problem was raised by the technology users and not the producers and developers.
- *Windshield systems for microphones with water-repellent surface*. DPA Microphones is interested in developing a product giving new possibilities for use of microphones in wet environments, e.g. rain. Status for this project is establishment of a cooperation between producers and researchers in order to develop the technology for surface treatment.
- *Development of LED 3 W white diode source of light to replace conventional 15-20 W glow lamp.* An ongoing project aims at developing a high quality LED (light emitting diodes) lamp. Novel micro- and nanostructured optical elements are being developed for efficient colour mixing and light control. The project is performed in collaboration between Risø, and the Danish industrial partners, NESA, RGC-Lamps and Nordlux. A new project continues and extends this work and also includes development of new lamps for this new generation of innovative light sources. This work is done in cooperation with the two Danish companies Asger BC Lys and Louis Poulsen Lighting. Both projects are supported by ELFOR, Dansk Eldistribution.

Cross institutional and interdisciplinary collaboration

Cross institutional and interdisciplinary networks and collaboration can be an attractive and necessary approach in order to find societal robust solutions to societal demands and needs. However, such arrangements often must face great obstacles to make the collaboration profitable and successful. Setting-up such networks and projects mixing different kinds of working fields, competences and skills also means that different requirements to documentation of knowledge and competences, funding, criteria for success, planning horizons etc. are going to be taken into account in the organisation of joint projects.

Scientific work is characterised by processes with long time horizons, 10-15 years or even more. In the scientific world, the most prominent criteria of success is documentation of scientific work through publication of articles in peer-reviewed international journals. Other success criteria are patents and industrial co-operation. The process from initiation of a project and generation of results over article writing to acceptance and publication in a journal can take several years. Looking at cultural event organisers, they often have to manage very short planning horizons as they have to offer events with popular or new artists. As an example, for the Roskilde Festival the success criteria are happy festival participants & volunteers, contended performers & musicians, pleased sponsors & politicians and balance in economy.

Advertising and marketing are other fields where scientific institutions and cultural event organisers have different traditions and behaviour. Also in this field, the different view on documentation plays a role. Scientists are not used to public exposure on preliminary results, they strongly prefer only to be exposed when the results are reliable and substantiated. For the event organisers advertisement and marketing are essential measures to get into contact with their costumers. Especially, the event organisers way of behaving what concerns advertisement and obtaining publicity on Musicon Valley arrangements have been a challenge and learning process for Risø. The challenge has been the public exposure on project ideas in their early stage of development. The learning process has been on getting experiences to the general requirement to research institutes being more visible to the surrounding society. If an institution as Risø is going to maintain its level of activity, we have to improve what concerns visibility and communication to the society as well as government.

The Musicon Valley Growth Environment have large in common with networks. According to Kahn & Prager (1994) all networks have four common stages in their organisational development:

- *Listening Across the Gulf*: Early meetings of networks show a familiar pattern of behaviour: successive pronouncements more or less on the subject, heard with varying degrees of attention and comprehension by their listeners. The underlying task at this early stage is the search for a common theme, specific enough to attract members intellectually but general enough to give them room for exploration in their own terms.
- *Conceptual Translation*: The underlying task to develop a common language, a prerequisite for collaborative work. The result is a shared conceptual vocabulary, smaller and less specialised than the vocabulary of any single discipline, but enabling each member to assimilate the work of other disciplines to his or her own.
- *Onset of Collaboration*: The third stage involves activities of consultation, marked by a high degree of mutual tolerance, an eagerness to help, and a willingness to be helped. In some networks, this level of integration leads quickly to the major collaborative efforts; in others, the process is more gradual.
- *Joint Projects*: Some networks tend to reach this stage in their second year, some later.

These stages looks recognisable from a Musicon Valley perspective. The Musicon Valley Growth Environment have now been running for about two years and its development stage is something in between stage two and three. We have had several meetings and arrangement in order to obtain a common language and establish a common frame of reference. We have identified common interests and possibilities for collaboration but we have also identified substantial discrepancies concerning the overall understanding of the Musicon Valley Growth Environment. As part of the activities in the Musicon Valley Growth Environment, a pilot study was carried out addressing the conditions for formation of a competence cluster among Danish actors working with sound and light technologies within the live-event sector. The study concluded that at present an incipient cluster formation can not directly be identified. The conclusion is largely drawn on the observation that three very different understandings and interests exist among the respondents what concerns the overall idea and possibilities for cooperation within the frame of the Growth Environment (Rasmussen & Skjerning, 2005):

- a broad covering approach addressing creative industries with emphasis on events or products where the increase in value is established through some kind of staging or production
- a clear-cut distinction between the sound technology sector and the light technology sector motivated in the physical and technological differences between sound and light technologies
- a clear-cut distinction between technology producers, professional users and end users motivated in conflicting economic interests and large cultural differences.

Innovation processes and understanding

Innovation processes demand a considerable amount of resources: Human resources as well as capital. There is no guarantee for success as innovation processes are very complex and depend on a huge amount of driving forces, interests, competences etc.

Looking at the innovation process proposed by Kolodovski, the activities within the Musicon Valley Growth Environment mainly have been focused on the first step, i.e. getting ideas and identifying interesting problems to solve or discovering new technological capabilities, and to some extent on step two, i.e. matching problems and technical capabilities to create new solutions. The most resource demanding steps, i.e. the commercialisation steps, have only been addressed to a minor extent. The Musicon Valley Growth Environment has been very focused on building networks and on the assumption that placing people in new constellations confronting them each others' viewpoints and competences will create new ideas and that this is the hard core of an innovation process. But, referring to innovation theory, this assumption is not well justified. Ideas are necessary, but only the beginning of a hard and resource demanding process.

Regional anchoring

The Musicon Valley organisation has been launched and supported by the municipality and the county of Roskilde. At the municipality level (Roskilde Kommune, 2005), the city council has formulated an ambitious plan for developing Roskilde and the region as a musical power centre.

At local and regional level the expectations to the Musicon Valley initiative have been rather high, but also at municipality level there has been a lack of understanding what concerns the huge amount of resources needed to accomplish the innovation processes. The financial support from the municipality has been rather low and allocated only on annual basis; this kind of short-term support is not in accordance with the rather long time horizons needed for innovation through networks.

Future work and perspectives

The funding to the Growth Environment from the Ministry of Technology, Science and Innovation has been allocated for a three years period. Looking at the time horizons for development of new networks and joint projects, three years is probably too short. The Growth Environment experienced difficulties reaching common interests within the domain of light and sound technologies, and in building up new constellations between event industry and technological science, it is of importance to have more than one shot. Therefore, Risø wanted to explore the possibilities in another technological domain; material science was chosen as this is a core competence field at Risø. Recently, Risø arranged a conference entitled ”Materials and innovation in the creative industries”. The conference surprisingly attracted about 130 participants and afterwards the conference was covered by the press. At Risø the tasks for the next year will be to identify technology projects and innovation opportunities in this area.

Risø is a technological research institute which must be able to compete internationally, otherwise the institution cannot manage the requirements for getting funding. The strong priority at the international level can conflict with involvement and contribution at regional scale. It is of interest to Risø to be located in a strong region in Denmark in order to attract competent staff, therefore Risø has to balance between regional, national and international perspectives.

The relations, arrangements and co-operations in the Musicon Valley Growth Environment have been an eye-opener at Risø. We have got new experiences in building networks and we have learned new ways of being visible outside the scientific world. The public relations activities have been of great value for Risø. It has been overwhelming and a positive experience that the media have shown a noteworthy and considerable interest in Musicon Valley and Risø’s participation. We hope, that this will play a role in creating a image of Risø as being in front what concerns creativity and technology and that the institution in that way can be a central player in development of the region.

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